Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Revision of the Commission's Rules	)	
to Ensure Compatibility with	)	CC Docket No. 94-102
Enhanced 911 Emergency Calling Systems	)	
	)	
Wireless E911 Phase II Automatic	)	DA 99-1049
Location Identification Requirements	)	

COMMENTS OF SNAPTRACK, INC.

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Dated: June 17, 1999

SUMMARY

The Bureau's inquiry in this proceeding is vital to the overriding public interest in accurately locating wireless subscribers placing E911 calls, and thus saving lives in emergency situations. Every month that passes threatens deployment of ALI technologies that can substantially out-perform the Commission's Phase II benchmarks and save lives.

Rapid Commission action is now essential to preserve the handset alternative as a viable approach to meeting the Commission's Phase II ALI requirements. Without prompt conclusion of the regulatory issues raised in the *Public Notice*, handset solutions—which in light of the significant limitations of network-based E911 technologies may represent the most realistic method for implementing Phase II ALI requirements—will be inadvertently precluded by wooden application of the Commission's rules. As a result, no workable Phase II solution will be implemented by the October 1, 2001 deadline and lives will be lost.

The record in this docket demonstrates that handset-based ALI technologies exist, have been thoroughly tested, offer substantially greater accuracy than network-based technologies, and can locate wireless subscribers in many areas (rural locations, urban high-rise "canyons," etc.) where other technologies perform poorly or not at all. But until the Commission gives unequivocal direction—the "specific regulatory guidance" sought by CTIA in its pending February 1998 reconsideration petition—that a phased-in approach will be acceptable, as the Bureau Chief has testified "no one, no carrier, no system" can deploy ALI-capable handsets to satisfy Phase II requirements.

The basic focus of both the SnapTrack and APCO approaches is identical: they propose that the Commission substitute a phased-in schedule for the October 2001 deadline of Section 20.18(e) in exchange for (i) faster deployment, and (ii) greater accuracy. Such a phased in ap-

proach remains the best means of promoting development of handset-based ALI alternatives. The Commission should not, however, impose an obligation upon carriers adopting a handset-based system "to offer either to retrofit or to replace subscriber handset to make them ALI-capable." Such intrusive regulatory intervention should be rejected in favor of maximizing reliance on the marketplace to meet consumers' wireless location requirements.

APCO proposes handset penetration deadlines that, in SnapTrack's view, appear to reflect realistic market penetration objectives. Yet this proposal raises the important policy question of whether mandated requirements are necessary or warranted. SnapTrack's approach represents a fundamental preference for reliance on the marketplace to ensure handset deployment over regulatory mandates. Although SnapTrack is not opposed to the specific APCO-proposed penetration deadlines, we believe it is important for the Commission to address directly whether a market-based approach to handset-ALI deployment can best accomplish the Commission's public policies.

The *Public Notice* requests comment on two additional issues—roaming and the RMS statistical measure—that relate to *all* ALI technologies, not just handset solutions. The record is clear that roaming issues for handset-based solutions are limited. Only roamers without an ALI-capable handset roaming into a system using a handset-based approach will have any potential Phase II issues. Yet, this "problem" is likely to be relatively transitory, as standards bodies are actively completing interoperability standards for ALI that will apply to each wireless air interface nationwide, and market trends plainly demonstrate that as ALI capabilities become universal in digital handset chipsets, most if not all new phones sold in the retail marketplace will be ALI-capable.

In any event, consumers who *want* Phase II or greater ALI while roaming will have ALI-capable handsets for purchase. Thus, Commission policy should not be driven by roamer concerns, since roaming subscribers can "vote with their wallets." Moreover, although the limited roamer concern with handsets will eventually disappear, some callers will *never* be located by network solutions, principally rural callers. With either technology, there are gaps in the coverage; accordingly, the Commission should not prefer one technology over another on the basis that some E911 calls may not be located. There is certainly no record basis for concluding that the coverage gaps for handsets, a limited number of roamers, are more "important" than the gaps in network technologies, *i.e.* rural callers in their home systems. Indeed, from one perspective a handset-based approach is preferable, because the accuracy of location information is not dependent on where one lives.

Finally, there is no dispute that the RMS measurement methodology is flawed because it substantially exaggerates the numerical impact of "missed" locations (non-fixes or high errors). The public safety community, carriers, industry and even Commission Staff have acknowledged that RMS is a statistical methodology that fails to produce a workable numeric benchmark for ALI compliance, and that affects compliance measurement regardless of technology used. Accordingly, the Commission should adopt an alternative methodology for determining ALI accuracy. SnapTrack has suggested CEP, but any statistically valid measurement method that avoids the anomalies of RMS is acceptable. Indeed, WEIAD's proposal of "125 meters in 67% of cases" may be preferable due to its simplicity.

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To: Chief, Wireless Telecommunications Bureau

COMMENTS OF SNAPTRACK, INC.

SnapTrack, Inc., by its attorneys, submits these comments in response to the Bureau's *Public Notice*[1] request for "targeted comment" on handset-based technologies for wireless enhanced 911 ("E911") Phase II Automatic Location Identification ("ALI") requirements.

INTRODUCTION

The Bureau's inquiry in this proceeding is vital to the overriding public interest in locating wireless subscribers placing E911 calls—and thus in saving lives in emergency situations. In December 1997, the Commission explained that its ALI rules for wireless carriers, including the "Phase II" accuracy standard and the October 2001 implementation deadline, were intended to be technologically and competitively neutral.[2] Where necessary to accommodate technologies that offer public safety agencies the chance to save more lives by providing better, more accurate ALI data, the *Reconsideration Order* correctly indicated the Commission's willingness to modify

[1] Public Notice, DA 99-1049 (rel. June 1, 1999)("Public Notice").

[2] *Revision to the Commission's Rules to Ensure Compatibility With Enhanced 911 Emergency Calling Systems,* Memorandum Opinion and Order on Reconsideration, CC Docket No. 94-102, 12 FCC Rcd. 2265, ¶ 124 (1997)("Reconsideration Order").

Section 20.18(e) of its Rules. The central criterion of the Bureau's analysis should accordingly be whether providing wireless carriers the option to deploy GPS or other handset-based ALI technologies will provide public safety officials with the information necessary to more accurately locate emergency callers and save the lives of wireless subscribers throughout America. The best way to achieve this important goal, SnapTrack believes, is for the Commission to aggressively support the development of ALI alternatives so that carriers, PSAPs and consumers can choose the best method of saving lives.

SnapTrack commends the Bureau for taking steps to finalize waiver guidelines for handset-based ALI approaches in what the *Public Notice* has emphasized will be an "expedited" manner.[3] Rapid Commission action is essential to preserve the handset alternative as a viable approach to meeting the Commission's Phase II ALI requirements. Without prompt conclusion of these regulatory issues, handset solutions—which in light of the significant limitations of network-based E911 technologies may represent the most realistic method for implementing Phase II ALI requirements—will be inadvertently precluded by Section 20.18(e).[4] As a result, it is very likely that no workable Phase II solution will be implemented by the October 1, 2001 deadline and lives will be lost as emergency response is delayed by unavailable or inaccurate call location data.

As the Chief of the Bureau reiterated to Congress in February, the existing "flash cut" rule of Section 20.18(e) is not technologically or competitively neutral and artificially compels technology choice by wireless carriers. *"If our rules were applied literally, no one, no carrier, no system using a handset-based approach could satisfy our requirements.* Not because we

[3] Public Notice, DA 98-2631, at 2-3 (rel. Dec. 24, 1998) ("December Public Notice").

[4] 47 C.F.R. § 20.18(e).

wanted to rule it out, because we wrote the rules in a way without that in mind."[5] It is this problem, inadvertent but nonetheless a complete barrier that can be overcome by "no one" adopting a handset-based approach to ALI, that the Bureau is addressing in the current comment proceeding.

Although the Commission has been working on this regulatory barrier since 1997, no solution has as yet been adopted.[6] SnapTrack therefore urges the Commission to complete its analysis and conclude this proceeding as soon as possible. The record in this docket demonstrates that handset-based ALI technologies exist, have been thoroughly tested, offer substantially greater accuracy than network-based technologies, and can locate wireless subscribers in many areas (rural locations, urban high-rise "canyons," etc.) where other technologies perform poorly or not at all. Manufacturers are poised to produce ALI-capable phones; to set these wheels in motion, the industry merely awaits a definitive signal from the Commission that Phase II compliance can be achieved with handset technologies.

Every month that passes threatens deployment of ALI technologies that can out-perform the Commission's Phase II benchmarks and save lives—in the parlance of the public safety community, "time is tissue." Until the Commission gives unequivocal direction that a phased-in approach will be acceptable, "no one, no carrier, no system" can deploy ALI-capable handsets to satisfy Phase II requirements. Without action, the substantial benefits offered by handset solu-

[5] The relevant excerpts from the transcript of the February 3, 1999 House Telecommunications Subcommittee hearings, including the complete exchange between Rep. Gordon and Bureau Chief Sugrue, are attached as Exhibit D to SnapTrack's June 1, 1999 Ex Parte.

[6] In the *December Public Notice,* the Bureau recognized that waivers or rule revisions are necessary for handset-based solutions to allay the uncertainty that paralyzes the deployment of ALI-capable handsets. The Commission indicated it would evaluate a "phased-in approach" to ALI compliance as a way of making Section 20.18(e) technologically and competitively neutral. *See Reconsideration Order* ¶ 124. The additional record compiled in this proceeding should assist in the prompt conclusion of the waiver issues first outlined by the Commission in 1997.

tions—faster deployment, greater accuracy and broader coverage—will not materialize and as a result lives that could have been saved will be lost.

The *Public Notice* seeks comment on two proposed sets of standards for handset-based solutions,[7] those presented by SnapTrack[8] and the Association of Public-Safety Communications Officials-International, Inc. ("APCO").[9] The basic focus of both the SnapTrack and APCO approaches is identical: they propose that the Commission substitute a phased-in schedule for the October 2001 deadline of Section 20.18(e) in exchange for (i) faster deployment, and (ii) greater accuracy. The similarity of the proposals is hardly surprising, since the same concepts were first suggested by the Commission in its December 1997 *Reconsideration Order.*[10] Such a phased in approach remains the best approach to promote development of competitive ALI solutions, including handset-based alternatives.

The Bureau also asks in the *Public Notice,* as it did in 1998, whether the Commission should "impose an obligation upon carriers adopting a handset-based system to offer either to retrofit or to replace subscriber handset to make them ALI-capable."[11] As addressed in detail in these comments, such an intrusive approach to regulatory compliance should be rejected in favor of maximizing reliance on the marketplace to meet consumers' wireless location requirements. Notably, even APCO's proposal on behalf of public safety does not go so far as to mandate forced replacement or recall of phones. Instead, APCO proposes market penetration deadlines that in SnapTrack's view, appear to reflect realistic market penetration objectives.

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[7] *Public Notice* at 2-5.

[8] Comments of SnapTrack, Inc., CC Docket No. 94-102, RM-8143 (Feb. 25, 1999) ("SnapTrack Comments").

[9] Further Comments of APCO, CC Docket No. 94-102, RM-8143 (May 25, 1999) ("APCO Further Comments").

[10] *Reconsideration Order,* ¶ 124.

[11] *Public Notice* at 6.

The fact that APCO's proposed penetration targets are consistent with the marketplace trend of steadily accelerating handset turnover raises the important public policy question of whether mandated requirements are necessary or warranted. This Commission has generally allowed the marketplace to function by maximizing reliance on competitive forces on questions of technology deployment and standards-setting, for instance in its recent Advanced Television ("ATV") and cable "navigation device" proceedings. Although SnapTrack is not opposed in principle to the APCO penetration deadlines, we believe it is important for the Commission to examine directly whether a market-based approach to handset-ALI deployment can best accomplish the Commission's public policies of (1) rapid implementation of effective ALI systems, (2) minimizing costs of compliance, and (3) minimizing interference with the marketplace.

In addition to compliance standards for handset-based ALI solutions, the Bureau has requested comment on two additional issues—roaming and the Route Mean Squared ("RMS") statistical measure—that relate to *all* ALI technologies, not just handset solutions.[12] Roaming affects all ALI approaches because Phase II ALI requires the Public Safety Answering Point ("PSAP") to request ALI capability and have a cost recovery plan in place.[13] Given the significant issues posed by cost recovery for PSAPs, these requests may not be widely forthcoming. Even network-based subscribers will not be located to Phase II standards when roaming to non-Phase II markets for some time. This roaming issue will persist until the Commission tackles and resolves cost recovery responsibilities. In contrast, the limited roaming problem associated with handset-based ALI technologies (where a consumer with a non-ALI phone roams into a wireless system using a handset-based ALI technology) will disappear over time as industry standards are finalized and as most consumers obtain ALI-capable phones.

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[12] Public Notice at 5-6, 6-7.

[13] 47 C.F.R. § 20.18(f).

There is no dispute that the RMS measurement methodology is flawed because it substantially exaggerates the numerical impact of "missed" locations (non-fixes or high errors). The public safety community, carriers, industry and even Commission Staff have acknowledged that RMS is a statistical methodology that fails to produce a workable numeric benchmark for ALI compliance, and that affects compliance measurement regardless of technology used. Accordingly, the Commission should adopt an alternative methodology for determining ALI accuracy. SnapTrack has suggested Circular Error Probability ("CEP"), but any statistically valid measurement method, such as Cumulative Distribution Function ("CDF"), that avoids the statistical anomalies of RMS is acceptable.

It is important to reiterate that the Commission has several procedural avenues available to immediately address handset-related issues, including pending waivers or reconsideration petitions (*e.g.*, CTIA's reconsideration petition seeking clarification of the December 1997 ruling on handset ALI phase-in).[14] Ultimately, the question of procedural approach is far less important than actually setting standards on which carriers, public safety and vendors can rely and plan. Every moment of inaction delays putting ALI capabilities in the hands of the public. The Commission must therefore conclude this proceeding rapidly if it wants carriers and the marketplace to have choice of handset solutions, and substantially greater ALI accuracy, prior to the existing October 2001 deadline.

[14] Petition for Reconsideration and Clarification of the Cellular Telecommunications Industry Association, CC Docket No. 94-102, RM-8143, at 23 (Feb. 17, 1998).

DISCUSSION

I. HANDSET-BASED STANDARDS MUST BE ESTABLISHED PROMPTLY

A. The Commission Should Fashion ALI Compliance Standards for Handset-Based Technologies With Generic Waiver Guidelines and Interim Rules

The Commission should fashion ALI compliance standards for handset-based technologies with generic waiver guidelines and interim rules. Commission resolution of the phase-in issues it first addressed in December 1997[15] is long overdue. The *Reconsideration Order* stated that the Commission has "not endorsed or mandated any particular ALI technology or approach," and did not "intend that the implementation deadline, the accuracy standard or other rules" would "unreasonably hamper the development of the best and most efficient ALI systems."[16] In October 1998, former Bureau Chief Dan Phythyon explained that the *Reconsideration Order* was intended:

> to specifically address concerns that aspects of the Commission's rules might appear to preclude a handset-based approach. For example, Section 20.18(e) of the Commission's Rules, 47 C.F.R. § 20.18(e), requires that carriers provide ALI for *all* calls, which might not be feasible under a handset-based approach for handsets currently in use.[17]

The Bureau emphasized that it would "continue to take reasonable steps to modify these rules [to support] the best and most efficient ALI technologies and systems, *including handset-based technologies and systems.*"[18] Finally, the Bureau's *December Public Notice* further explained that:

> A primary concern with applying these rules to handset-based technologies is that carriers may only be able to provide Phase II ALI for new handsets or handsets that have been upgraded to support the chosen technology. . . . It

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[15] *Reconsideration Order* ¶ 124.

[16] *Id.*

[17] Letter from Daniel B. Phythyon, Chief, WTB, to Pamela J. Riley, AirTouch (Oct. 23, 1998)(emphasis in original)(attached as Exhibit C to SnapTrack's June 1, 1999 ex parte).

[18] *Id.* at 3 (emphasis supplied).

> may not be possible or economically feasible for carriers to provide ALI for the embedded base of handsets that have not been upgraded on the date set by the current Commission rules. . . . [Therefore,] the Commission expressed its willingness to consider proposals to phase in implementation, especially to the extent a proposal helps achieve further improvements in ALI capabilities. This could mean, for example, a higher level of accuracy [or] applying the Phase II requirements only to new wireless phones.[19]

Without Commission action in the very near future, there is a very real risk of losing handsets as a viable ALI compliance technology. Carriers and manufacturers must have a clear and final decision from the Commission that a phased-in approach will be acceptable for Phase II compliance. This is not a new point. As CTIA explained in its still-pending February 1998 reconsideration petition:[20]

> [E]ven though handset technologies may offer great promise, any ALI solution that involves modification to handsets . . . cannot be implemented with a "flash-cut" transition. *In the absence of more specific regulatory guidance governing the transition to Phase II, handset-based technology could be unnecessarily discouraged.*

Unfortunately, there has not been the "specific regulatory guidance" carriers require in the 16 months since the CTIA petition. At this point in time, without the assurance of being able to rely on handsets to meet their Phase II obligations, carriers will not request manufacturers to begin production of ALI-capable phones. Handset manufacturing lead times, which generally run in the 12 to 18-month range, are already pressed to meet the January 1, 2001 in-service date proposed by both SnapTrack and APCO. Accordingly, if the Commission acts with dispatch, handset solutions will be available as a competitive alternative for Phase II ALI compliance; absent Commission action, they will not.

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[19] *December Public Notice* at 2-3.

[20] Petition for Reconsideration and Clarification of the Cellular Telecommunications Industry Association, CC Docket No. 94-102, RM-8143, at 23 (Feb. 17, 1998)("CTIA Reconsideration Petition")(emphasis supplied). CTIA suggested limiting Phase II obligations to new handsets or the adoption of "specific policies and guidelines to add certainty to the waiver process." *Id.* at 24.

Failure to enable handset ALI compliance through inaction would indeed be unfortunate. Handset solutions are broadly supported by carriers, public safety and consumers because they represent a viable technology, with improved accuracy, that will accelerate the ability to use location information to save lives. First, ALI-capable handsets promise faster deployment as they will provide ALI from the moment the first phone is provided to a customer. If the Commission acts immediately, these handsets will be available by the end of next year. Second, handset solutions provide substantially greater accuracy than network solutions. Under SnapTrack's proposal, handset would have to provide 90-meter accuracy, although carriers deploying our technology would realize even greater accuracy.[21] Third, a handset-based solution would be a lower-cost ALI implementation alternative that would relieve the pressure on already strained public safety budgets. All of these benefits squarely meet the public interest in locating wireless emergency callers and saving lives. Accordingly, the Commission should act now to modify its compliance standards to enable handset alternatives.

Perhaps the most glaring reason for the Commission to act now to permit carriers the choice of handset-based compliance is that network-based solutions—around which the rules were specifically designed[22]—need considerably more technical development and appear to have little chance of actually meeting Phase II deadlines. As the Wireless Consumer Alliance ("WCA") recently observed, "the evidence in the record shows that the network based solutions envisioned by the Commission in adopting Section 20.18(e) are so costly and inefficient that

[21] As discussed below, SnapTrack proposed the 90-meter standard to avoid criticism that it was pursuing a regulatory standard that gave its own ALI technology an unfair marketplace advantage. Nonetheless, it is undisputed that handset-based approaches can achieve location accuracy superior to the 90-meter standard. It is up to the Commission to decide whether the accuracy requirement for handset-based ALI approaches should be made even more rigorous that that proposed by SnapTrack.

[22] *Reconsideration Order* ¶ 123.

they will not be widely (if at all) deployed."[23] Despite the fact that the Commission wrote Section 20.18(e) contemplating a network-based technology, the record demonstrates that a network solution is unlikely to meet Phase II objectives. Thus, without handset-based ALI technologies there is a substantial and growing likelihood that there will be *no* ALI capabilities available to consumers on October 1, 2001. This inability to locate callers will continue to result in "loss of lives, lessened . . . chances of recovery from injury and wasted resources of emergency personnel"[24] as they aimlessly track the location of an emergency.

Network proponents contend that their approach is preferable because "all calls" will be located as of October 2001 using network-based ALI technology.[25] That is incorrect. Whether as a result of cost recovery difficulties or technical limitations, it is by now clear that there will not be a simultaneous, nationwide "turn-up" of network-based ALI systems on October 1, 2001. In reality, existing Section 20.18(e) will therefore be implemented with a phase-in, as different wireless systems in different geographic are brought "online" over time. Thus, the phased-in approach being considered for handset-based ALI solutions is merely a different form of phase-in to ALI compliance. It is a difference of degree, not of kind, which under both the SnapTrack and APCO proposals would result in a significantly faster start to this compliance phase-in.

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[23] Petition of Wireless Consumer Alliance, at 2 (June 1, 1999)("WCA Petition"). These deficiencies in network-based technologies, including their inability to work in digital environments, in multipath situations and were there are insufficient cell sites to support triangulation, were addressed in detail in SnapTrack's June 1 *ex parte* comments. Letter from Glenn B. Manishin, counsel for SnapTrack, to Magalie Roman Salas, FCC, June 1, 1999 ("SnapTrack June 1 ex parte").

[24] WCA Petition at 6.

[25] The objective of the Commission's ALI rules is to locate people, not calls; the Section 20.18(e) requirement for locating approximately 67% of all calls to 125 meters is merely a proxy for locating the wireless subscribers actually placing E911 calls. In this light, another problem with the arguments of network proponents is that network systems can locate a far larger proportion of "calls" in urban and suburban locations—were triangulation is feasible—than in rural areas. As a result, because network technologies may locate, for instance, 20 calls reporting a single freeway accident in an urban metropolitan area, while missing a single call from a rural traffic accident, network approaches create a glaring disconnect between location of calls and location of people. Indeed, network technologies will likely locate *well fewer* than 67% of all people, as this example illustrates.

The Commission can act quickly to enable handset deployment on the record in this docket and enable handset deployment to begin. The question of the appropriate procedural device selected by the Commission to enable handset alternatives is dwarfed by the pressing practical need to set handset compliance standards at the earliest possible date. Several procedural vehicles are available to the Commission, including (1) grant of the pending waivers on the condition that carriers comply with specified standards, (2) adoption of waiver guidelines that will provide certainty to carriers selecting technologies for ALI compliance, (3) promulgation of interim rules to amend existing Section 20.18(e), or (4) issuance of standards in a decision on the pending CTIA reconsideration petition.[26]

Ultimately, the Commission must act to eliminate the present regulatory uncertainty by enunciating the requirements carriers deploying handset-based alternatives must meet to comply with the Commission's Phase II rules. The most expeditious, and therefore in SnapTrack's opinion the best approach, is for Bureau, which is closest to issue, to act via waiver guidelines. A full Commission order,[27] preferable for long-run industry certainty, could follow any Bureau action on waiver guidelines.

B. Compliance Dates Depend on When the Commission Establishes Standards, As Carriers Must Look to Manufacturers and Handsets Require a Significant Manufacturing Lead Time

One of the key public interest benefits of handset-based solutions is that they can—if the Commission acts quickly—begin providing ALI well in advance of the October 2001 deadline. Unlike network-based ALI systems, which once requested by a PSAP are activated at substantial expense on a specific date system-wide, handsets begin providing ALI data the very moment a

[26] Petition for Reconsideration and Clarification of the Cellular Telecommunications Industry Association, CC Docket No. 94-102, RM-8143 (Feb. 17, 1998)("CTIA Reconsideration Petition").

[27] *See Public Notice* at 8 n.30.

consumer has an ALI-capable phone. This contrast is particularly significant given the present state of network technologies. Even if the hugely contentious stumbling block of cost recovery were resolved such that PSAPs could actually request a network-based, to date testing has shown network systems to be substantially unreliable and subject to serious coverage gaps.

As SnapTrack explained in its June 1, 1999 *ex parte* comments,[28] testing of network technologies by Houston Cellular Co. and the Greater Harris County E911 Emergency Network collapsed after Houston Cellular announced that it "will not go forward with an emergency call-locator system *because it is unproven and would put customers at risk.*"[29] Following these tests, Houston Cellular emphasized that network technology is inadequate because "[t]he test currently only locates customers on our analog network while the majority of Houston Cellular's customers are using digital technology; again leaving us unable to locate the vast majority of emergency calls."[30] Coupled with the fact that these systems are prohibitively costly, there is very substantial likelihood that network-based systems will not be deployed in time to meet the Phase II deadline. Further, because the Commission rules require a PSAP request as a prerequisite to providing ALI capabilities, the Commission will have no recourse against carriers that fail to enable ALI technology by the 2001 deadline.

In contrast to the void surrounding deployment of network-based systems, there is ample support in the record that carriers can be able to begin deploying location-equipped handsets 18 months after Commission release of definitive waiver guidelines for handset-based ALI compliance. Handset solutions offer the significant public interest benefit over network technologies of

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[28] Letter from Glenn B. Manishin, counsel for SnapTrack, to Magalie Roman Salas, FCC, June 1, 1999 ("SnapTrack June 1 ex parte").

[29] "Cellular Firm Won't Pursue Locator System for 911 Calls," Houston Chronicle, May 18, 1999 (attached as Exhibit A to SnapTrack's June 1 ex parte)(emphasis supplied).

[30] Open Letter from Houston Cellular at 1 (May 19, 1999)(attached as Exhibit B to the SnapTrack June 1 ex parte).

deployment of ALI capabilities well in advance of the October 2001 deadline. Both the SnapTrack and APCO proposals therefore envision deployment of ALI-capable phones beginning January 1, 2001. SnapTrack and APCO further propose that carriers selecting handset-based ALI solutions must commit to deploy only ALI capable handsets by a date certain.[31] APCO's December 31, 2002 date for "100%" ALI-capable handset deployment may be more realistic given the unfortunate delay in Commission guidance necessary for start of the 12-18 month handset manufacturing timeline.

Of course, these dates require swift action by the Commission. In considering the proposals proffered by SnapTrack and APCO,[32] the Commission must fashion rules that realistically account for the manufacturing timeline. Thus, rather than setting specific dates, the Commission should tie the deployment schedule to the date of its action in this matter. Until carriers have Commission assurance that ALI solutions will meet the Phase II rules, the manufacturing cycle cannot commence. Accordingly, to achieve the substantial benefits of early deployment the Commission must expedite its decision in this matter. Given the 18-month lead time for handset development and production, the September 1999 deadline suggested in the *Public Notice* for Commission action must be viewed as an outside date,[33] with an earlier decision far preferable.

In addition to faster deployment of ALI capabilities, handsets will promote the public interest by providing considerably more accurate location information. Both SnapTrack and APCO propose that carriers deploying handset-based ALI solutions should meet a more rigorous accuracy standard. From a public policy standpoint, the more accurate the location information,

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[31] Public Notice at 3; SnapTrack Comments at 9; APCO Further Comments at 2.

[32] In contrast, Sprint's proposal to combine handset solutions with a software-based network alternative provides only marginal additional benefit to consumers for an enormous cost that cannot be justified for an interim solution.

[33] *Public Notice* at 8 n.30.

the less time needed to respond to a 911 call. Thus, by improving accuracy, emergency providers can save more lives by responding more quickly.[34] Presently, the Commission requires carriers to meet a 125 meter accuracy standard.[35] The record supports an improved accuracy standard for handset-based technologies, consistent with the Commission's original contemplation of a Phase III requirement to improve location data accuracy.[36]

SnapTrack proposed that handset solutions meet a 90 meter accuracy standard,[37] which is consistent with APCO's more general proposal that carriers "commit to a specific average accuracy level substantially better than the current Phase II requirement."[38] Nonetheless, tests demonstrate that SnapTrack's ALI technology can produce substantially greater location accuracy. In an effort not to preclude less accurate handset technologies or to convey a regulatory monopoly on SnapTrack, we proposed to improve the accuracy from 125 meters to 90 meters. It is up to the Commission to determine whether the accuracy requirement for handset-based ALI approaches—which is a minimum only—should be made even more rigorous than that proposed by SnapTrack.

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[34] Some parties have questioned whether improved ALI accuracy is related to improved PSAP response in emergency situations, *i.e.*, whether improving the existing 125 meter standard would actually save more lives. Two situations illustrate the invalidity of these concerns. First, in urban locations the difference between 125 and 90 meters can be two or more blocks, the result of which will be several minutes, or well more, time saved by emergency personnel in locating victims. Second, even in locations where the general vicinity of the caller is known, greater accuracy can be life saving. For instance, on many interstate freeways there are multiple lanes in both directions and parallel service roads. With the substantially greater accuracy of handset solutions, PSAPs will be able to determine, even where the victim cannot speak or does not understand English, not only on which side of the highway the caller is located, but also whether the caller is on the interstate or the service road. Emergency experts have known for years that rapid response is the best way to save lives in cases of medical trauma, such as heart attacks. The difference in location accuracy can play a life or death role in these situations and many others.

[35] The Commission's rule requires ALI technology to provide "the location of all 911 calls by longitude and latitude such that the accuracy of calls is 125 meters or less using a Root Mean Square (RMS) methodology." 47 C.F.R. § 20.18(e).

[36] *See, e.g., Reconsideration Order* ¶ 122.

[37] SnapTrack Comments at 8.

[38] APCO Further Comments at 3.

The Commission should also keep in mind that with handset solutions, accuracy can be improved significantly over time without the imposition of further costs on limited public safety budgets. As technology improves and is incorporated into phone chipsets, ALI-capable phones provided to consumers will provide greater accuracy. In contrast, a network-based solution cannot be upgraded for superior accuracy without a substantial investment of time and money because the performance of the system is static from the moment of turn-up. Thus, the 90-meter accuracy standard for handsets not only provides substantial improvement over the Commission's present 125-meter standard, it is a minimum starting point that will be eclipsed by some phones immediately and many more over time. In this way, handsets ensure continual improvements in accuracy without the need for the Commission to revisit the accuracy standard in a Phase III proceeding. The *Public Notice* accurately concludes that a principal public interest benefit of the SnapTrack and APCO proposals is that "carriers deploying a handset-based solution would be required to start providing ALI on wireless 911 calls before the October 1, 2001 deadline and to provide ALI to a greater degree of accuracy than required under the Commissions rules."[39]

C. The Commission Should Rely on the Market to Facilitate Handset Penetration Rather Than Mandate Specific Penetration Requirements

The primary distinction between the SnapTrack and the APCO proposals is the inclusion of penetration criteria outlined in APCO's proposal.[40] This distinction represents a fundamental preference for reliance on the marketplace to ensure handset deployment over regulatory intrusion into the market via mandates. SnapTrack is confident that carriers can leverage the digital

[39] Public Notice at 3.

[40] APCO Further Comments at 3. In addition, APCO's "standards compliance" criterion, *id.*, is also a good addition, as it ensures that the roaming issue is met by allowing different handset ALI technologies to interoperate across different systems. *See* Section II.B.

conversion of handsets to ensure rapid penetration of ALI technology. By requiring carriers to promote ALI-equipped handsets on at least the same terms as other handsets, the market will determine the rate at which consumers adopt the new handsets. Through the anticipated turnover rates, the proportion of non-ALI capable handset will rapidly and steadily decrease over time until no significant issue of noncompliance exists.

The Commission should not hold handset technologies to a penetration level that exceeds any conceivable location coverage of competing network-based technologies. As discussed previously, and raised repeatedly in the record, network technologies have serious unredressed coverage gaps, including among others, rural areas and digital systems. The Commission's present rules impose no requirements on these systems to improve their coverage. Similarly, in the interest of regulatory parity, it is only fair that handsets should not be held to a specific level of penetration by a date certain.

SnapTrack recognizes that both APCO and some Bureau Staff members are equivocal about reliance solely on projected handset turnover and would prefer to "backstop" the marketplace with penetration guarantees. If the Commission insists upon penetration criteria as an insurance mechanism for compliance with handset Phase II phase-in deadlines, the APCO penetration figures appear reasonable and reflect an astute awareness of the marketplace realities of increasing handset turnover, decreasing handset costs, and customer preference for ALI capable phones. If *realistic* criteria, such as those proposed by APCO, are used, the Commission avoids placing itself in untenable position of mandating that carriers do something that the marketplace (*i.e.*, consumers) do not want.

Indeed, because APCO's proposed penetration deadlines conform to realistic projections of handset turnover, there should be no need to require carriers to buy back or buy down hand-

sets in order to achieve compliance. The use of handset criteria as a means of forced handset "recall" would be inappropriate as a policy matter because it would represent an undue Commission intrusion into the marketplace that runs contrary to its historical reliance on competition. Consumers would lose the ability to choose *not* to have ALI. Carriers should retain business discretion to achieve penetration milestones in manner they see fit, for instance through promotions, new services, discounts or other incentives. APCO's proposal for penalties, such as waiver revocation or fines,[41] is thus highly preferable to such a forced recall, because it allows businesses to determine how best to meet the Commission's requirements.

In addition, the enforcement approach suggested by APCO gives the Commission flexibility to assess the nature, reasons and scope of non-compliance on case-by-case basis and to address those circumstances appropriately. SnapTrack believes that fines or other penalties should be based on the relative culpability of a carrier, such that failure to achieve the penetration standards would impose upon a carrier the burden of explaining the reason and extent of its non-compliance. Just as inadvertent or excusable violations of existing Section 20.18(e) do not result in any automatic penalties, carriers utilizing handset-based technologies should not be subject to automatic penalties, without consideration of the specific facts of their case, for violation of whatever handset-specific criteria the Commission ultimately adopts.

[41] APCO Further Comments at 3.

II. ROAMING ISSUES ASSOCIATED WITH HANDSET SOLUTIONS ARE VERY LIMITED AND ARE BEING ADDRESSED THROUGH THE INDUSTRY STANDARDS PROCESS

A. Roaming "Problems" With Handset Solutions Are Confined To One of Four Possible Roaming Situations and Will Be Made Obsolete By Handset Manufacturing Developments

The record is clear that roaming problems for handset-based solutions are limited. [42] Most roamers will be located by handset technology or a network technology in the roaming system. Roamers with ALI-capable handsets will be located in both network systems and, by virtue of industry standards, in any other handset-based system. Roamers without ALI-capable phones will be located in network systems to the same extent as any call is located in a network system. Thus, only roamers without an ALI-capable handset roaming into a system using a handset-based approach will have any potential Phase II issues. Moreover, this problem may be *de minimis*. There is no demonstrated evidence that the proportion of E911 calls placed by roamers is sufficiently significant to warrant undue concern.

Any residual concern, however, should be mitigated by recent announcements by manufacturers. Motorola, Texas Instruments and QUALCOMM have all committed to provide ALI capability in their handset chipsets.[43] In other words, the leading manufacturers of wireless phones have all agreed to embed ALI capabilities in the digital circuitry of their wireless handsets. These market trends plainly demonstrate that as ALI capabilities become universal in handset ASICs, most if not all new handsets sold in the retail marketplace will be ALI-capable. Therefore, even where a consumer's "home" system uses a network technology, that customer's phone will be ALI-capable and can be located when roaming in a handset system.

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[42] *See* SnapTrack *ex parte* at 8-9 (filed May 5, 1999)("SnapTrack May ex parte").

[43] Press Release of Motorola (Apr. 26, 1999) (attached to SnapTrack May ex parte); Texas Instruments Comments at 2; QUALCOMM Press Release (SnapTrack Comments, Attachment B).

Over time, the scope of problem on which *Public Notice* seeks comment is limited to the very small proportion (less than 15 percent) of handset vendors that do not use TI/Motorola chips. It is likely that these vendors will also, upon carriers' requests and under increasing market pressure, move to equip new phones with ALI-capable chips. In any event, consumers who *want* Phase II or greater accuracy while roaming will have ALI-capable handsets available for purchase. Roamers can make choices about location-equipped handsets in same way they make choices about rate plans which include roaming. Thus, Commission policy should not be driven by roamer concerns, since they can "vote with their wallets."

In contrast, although the limited roamer concern with handsets will eventually disappear, some callers will *never* be located by network solutions. Section 20.18(e) expressly recognizes that regardless of the technology used to implement ALI, some proportion of callers will not actually be located to Phase II standards. For network technologies, a large proportion of callers in rural areas cannot be located. For handset-based technologies, a small subset of roamers may not be located under certain conditions. With either technology, there are gaps in the coverage; accordingly, the Commission should not prefer one technology over another on the basis that some E911 calls may not be located. There is certainly no record basis for concluding that the coverage gaps for handsets, a limited number of roamers, are more "important" than the gaps in network technologies, *i.e.* rural callers in their home systems. This is especially true given that over time, handset coverage gaps will disappear (as ALI-capable phones become ubiquitous), but the gaps in network technologies are inherent in the technology and thus will remain. Indeed, from one perspective a handset-based approach is preferable, because the accuracy of location information is not dependent on where one lives; because it uses GPS-based, handset ALI technology is geographically indiscriminate.

B. Industry Standards Ensure that ALI Will Be Available to All Roamers, Regardless of Technology, Wherever A Wireless Signal Can Be Received

Each wireless air interface is separately standardizing ALI as part of its standardization process.[44] As a result, ALI will be available to all roamers, regardless of technology, wherever a wireless signal can be received.[45] Since the whole point of industry standards is to ensure interoperability of systems, as these air interfaces standardize, roamers will be locatable. That is, whether a wireless industry segment standardizes on a network or a handset approach, it will be implemented industry-wide by all carriers using that air interface method. Hence, all CDMA systems, for instance, will be ALI-capable and transparently interoperable for both "home" and "roaming" wireless callers. In this regard, APCO's "standards compliance" criterion, is a useful addition to handset waiver criteria, as it ensures that the roaming issue is met by allowing different handset ALI technologies to interoperate across different systems.[46]

III. THE ROOT MEAN SQUARE METHODOLOGY FOR ALI COMPLIANCE MEASUREMENT IS WIDELY RECOGNIZED AS INVALID AND SHOULD BE REPLACED

The Bureau seeks comment on the requirement in Section 20.18(e) that carriers use a root mean square methodology in calculating accuracy and "invites recommendations on the appropriate methodology for measuring ALI accuracy, consistent with our goal of providing the best ALI accuracy for all callers."[47] As the Wireless E9-1-1 Implementation Ad Hoc ("WEIAD") and other have pointed out, the problem is that a single non-fix (infinity) or inaccurate fix (*e.g.*,

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[44] *See* SnapTrack June 1 ex parte at 7-8 and Exhs. F-G. For instance, for CDMA, the TR45.5 Committee of the Telecommunications Industry Association has been working on "an open standard accommodating various technologies/techniques to ensure interoperability" since November 1998. *Id.*, Exh. F at 4. TR45.5 has produced an "initial version of the standard sufficient for E911 location," and has completed the first ballot of the text of the standard. *Id.* at 6, 9.

[45] If no signal is available, of course, neither ALI nor wireless service is available to the roamer.

[46] APCO Further Comments at 3.

[47] *Public Notice* at 7.

1/4 mile) can skew statistical results so far, due to the squared nature of RMS calculation, that carriers can comply for well more than 67% of calls but nonetheless fail an RMS test.[48] For example, a carrier could fail the Commission's RMS criteria "if there were a few instance of default to especially large cells, or more cases of default to smaller cells whose radii nevertheless exceeded 125 meters."[49]

SnapTrack agrees that this was not the Commission's intention, and for this reason proposed an accuracy standard of 90 meters using a Circular Error Probability ("CEP") statistical method for handset-based ALI solutions.[50] The RMS statistical anomaly is inconsistent with the purpose of creating a reasonable numerical measure of ALI compliance, as explained by Commission in its earlier decisions in this proceeding.[51] TruePosition's defense of RMS is thus ill-conceived, as RMS problems affect ALI compliance regardless of the ALI technology employed. Indeed, even the Bureau Staff familiar with this issue have indicated publicly (for instance at the January 1999 AIC Worldwide Wireless E911 conference in San Antonio) that the RMS method is not workable.

The Ericsson and WEIAD requests for clarification demonstrate that carriers and public safety are both concerned about the statistical compliance problems created by use of an RMS standard. To that end, SnapTrack has proposed accuracy standards based on circular error probability ("CEP"), the same statistical methodology suggested by Ericcson. SnapTrack's proposal

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[48] Ericsson *ex parte* Presentation, CC Docket No. 94-102 (Mar. 20, 1998); Ericsson *ex parte* presentation, CC Docket No. 94-102 (Apr. 6, 1998); Letter to Magalie Roman Salas, FCC, from James R. Hobson, counsel for National Emergency Number Association, acting for WEIAD, CC Docket No 94-102 (Nov. 25, 1998)("WEIAD ex parte").

[49] WEIAD ex parte at 3.

[50] SnapTrack Comments at 8; Public Notice at 7. RMS also assumes a specific distribution of deviations around the mean ("Gaussian distribution") that is achievable only in theory. WEIAD ex parte at 2. Where the actual distribution differs, RMS-based calculations are inaccurate.

[51] *Reconsideration Order*, ¶¶ 125-26.

is just one variation of the well-accepted conclusion that RMS replacement is necessary. The primary objective of any compliance criterion is that the statistical test adopted accurately reflect the Commission's understanding that some proportion (about 33%) of ALI calls need not be located to the Phase II location accuracy standard without putting carriers in violation of Section 20.18(e). CEP is one way to achieve this goal, but any statistically valid measurement method, such as Cumulative Distribution Function ("CDF"), that avoids the anomalies and inaccuracies associated with RMS is acceptable.[52] Indeed, WEIAD's proposal of "125 meters in 67% of cases" may be preferable due to its simplicity.[53]

[52] CDF is a widely recognized statistical measure of calculating error within standard deviations. *See* Tekinay, Chao & Richton, "Performance Benchmarking for Wireless Location Systems," 36 IEEE Communications 72-77 (April 1988).

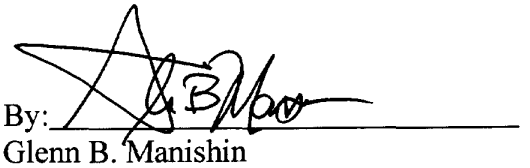
[53] WEIAD ex parte at 1.

CONCLUSION

For all these reasons, the Commission should expeditiously adopt waiver guidelines, as outlined in the *Public Notice,* to provide carriers with the option of deploying handset-based ALI solutions for Phase II E911 compliance.

Respectfully submitted,

SNAPTRACK, INC.

By: 

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Dated: June 17, 1999

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